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Case Report

A rare case of complicated pericardial effusion with *Elizabethkingia meningoseptica* from Iran

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Abstract: Infections due to *Elizabethkingia meningoseptica*, a Gram-negative oxidative bacterium are frequently founded in neonatal and immunocompromised individuals. The notable characteristic of this organism is its multi-drug resistance to common antibiotics used for infections caused by Gram-negative bacteria. We report a rare case of complicated pericardial effusion due to *E. meningoseptica* in a 2-year-old boy, who was admitted with chief complaints of fever and tachypnea (mentioned by his parents) and suffered from a rare lung malignancy (lymphangioleiomyomatosis). He was successfully treated with vancomycin. *E. meningoseptica* infection is a rare situation in immunocompetent hosts, and we concluded that this infection was probably originated from device medicine or even hands of healthcare workers.

Key words: *Elizabethkingia meningoseptica;* Pediatric; Lung malignancy; Iran.

Introduction

Elizabethkingia meningoseptica formerly known as *Chryseobacterium meningosepticum* is a Gram-negative rod that is widely distributed in natural environments (1, 2). Infections due to *E. meningoseptica* is uncommon and considered as an opportunistic pathogen in humans; however, reported cases in the intensive care unit setting have been rising over recent years (2). Mainly, infants and immunocompromised patients are vulnerable to infection by this bacterium. Several risk factors are noted in association with the acquisition of *E. meningoseptica* infection, including immunosuppression, underlying medical diseases, prolonged hospital stay, prior exposure to broad-spectrum antibiotics, indwelling medical devices (3). Although bacteraemia is the most common manifestation, a wide range of infections documented by *E. meningoseptica* (4-7). Due to multidrug-resistant nature of *E. meningoseptica*, infections caused by this organism are associated with poor outcomes (8). Given that the multidrug-resistant properties of this bacterium often leads to the inappropriate choice of empiric antibiotics. We report a rare case of complicated pericardial effusion due to *E. meningoseptica* in a patient with pericardial effusion.

Case report

The patient is a two years old boy that with chief complaints of fever and tachypnea (mentioned by his parents) was brought to the emergency ward of a regional hospital in Shiraz, Iran. The patient had a history of twice admission with a diagnosis of pericardial effusion due to lung lymphangioleiomyomatosis (LAM) that these effusions had been drained in both times. The last time of his admission was about two months ago with the same condition. Vital signs of the patient on admission were temperature (axillary) 38.7 °C, pulse rate 118 beats per minute (bpm), respiratory rate 34 bpm and blood pressure 100/70 mmHg. The general appearance of the patient was ill. So, after doing transthoracic echocardiography (TTE) the patient was admitted with a diagnosis of recurrent pericardial effusion. The effusion was drained under the guide of TTE and sampling was done from his effusion for cellular and microbiological evaluations.

Laboratory findings revealed a white blood cell (WBC) count of 9,400 cells/mm^3 with 72% neutrophils, hemoglobin (Hb) of 8.3 g/dL, and platelets of 397,000 mm^3. The level of blood sugar (BS) was 118 mg%, sodium was 130 mmol/L, potassium 5.2 mmol/L, magnesium 2.1 mg%, phosphorus 3.7 mg%, urea nitrogen 5 mg%, and creatinine 0.4 mg%. After 4 days WBC count and neutrophils percent were 4,200 cells/mm3 and 65.4%, respectively.

The sheep blood agar plate was taken from pericardial effusion, demonstrated multiple non-hemolytic yellow-pigmented colonies with an unpleasant odor (Figure 1). There was no significant growth on MacConkey agar plates. Primary identification showed the bacterial isolates were polymorphs and Gram-negative rods, nonmotile and oxidase positive (9). Subsequently, the isolate was identified as *E. meningoseptica* on the basis of further biochemical reactions, including non-fermenter, indole, gelatinase and urease positive by API 20E system strip (BioMérieux, France) (9). Minimum inhibitory concentrations (MICs) were determined by the MIC strip test (Lioflichem, Italy) for imipenem,

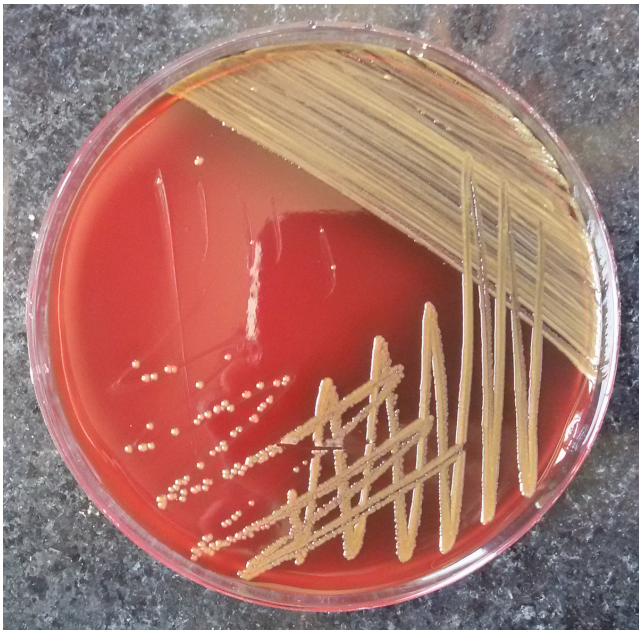

Figure 1. Non-haemolytic yellow pigmented colonies of *Elizabethkingia meningoseptica* on sheep blood agar plate.

trimethoprim-sulfamethoxazole, ciprofloxacin, ceftazidime and vancomycin as described by the Clinical and Laboratory Standards Institute's (CLSI) recommendations (10). Susceptibility interpretation was according to the CLSI breakpoints for Other Non-Enterobacteriaceae and *Staphylococcus* spp. for vancomycin (10). The organism was resistant to imipenem (MIC >32 µg/mL) and sensitive to trimethoprim-sulfamethoxazole (MIC >0.19 µg/mL), ciprofloxacin (MIC >0.38 µg/mL), ceftazidime (MIC 1.5 µg/mL) and vancomycin (MIC 1 µg/mL). Fortunately, our case was treated with intravenously vancomycin injection based on the susceptibility testing results.

Discussion

E. meningoseptica as an emerging nosocomial pathogen is frequently associated with a spectrum of infections (11). Despite the occurrence of intermittent epidemics caused by *E. meningoseptica* in neonatal intensive care units (NICU); but, the source of such infections is usually not understood (12, 13). However, the infection can occur due to exposure to contaminated colonizing source including the hands of healthcare workers, sinks, water tanks, ventilator tubing, saline solution, etc. (2, 5, 11). The mentioned case in the present study had a history of two times surgery and effusions drainage and chest bandage that may be possible routes of contamination *with E. meningoseptica* in hospital environments.

Although producing protease, elastase and gelatinase contribute to the pathogenesis, the virulence factors responsible for *E. meningoseptica* pathogen have not yet been fully recognized (12, 14). This organism is an opportunistic pathogen being most often associated with meningitis and bacteremia in the pediatric population (4), accordingly with our observations. To the best of our knowledge, this is the first report of complicated pericardial effusion due to *E. meningoseptica* in an Iranian pediatric population. Among the neonatal or immunocompromised population, *E. meningoseptica* has been reported to cause a variety of infections including pneumonia, bacteremia, sepsis, endocarditis, osteomyelitis, and endophthalmitis (4, 5, 8). Our studied patient was suffered from a rare lung malignancy (LAM) which had probably a significant role in increasing risk of complication with *E. meningoseptica*. It has been mentioned that the potential risk factors for developing *E. meningoseptica* infections are malignancies, organ transplant, neutropenia, etc. (15).

Due to multidrug resistance nature of *E. meningoseptica* including β-lactams and aminoglycosides, its infections are associated with an increase of mortality (23-52%), hence it is a clinical concern (2, 16). Interestingly, *E. meningoseptica* is susceptible to many antibiotics used to treat infections due to Gram-positive cocci (2, 11). Results of susceptibility testing especially for disk diffusion method are varied and may be unreliable since there are no defined breakpoints for *E. meningoseptica* in CLSI or EUCAST (10, 17). Therefore, to determine *in vitro* susceptibility, broth microdilution testing or E-test as an alternative method has been recommended (2, 12, 15). During recent decades, vancomycin has been used as the drug choice to treat *E. meningoseptica* infections (5). Despite reports of increasing resistance to vancomycin (5), our isolate had a good sensitivity (MIC 1 µg/mL). This discrepancy could be attributed to widespread use of antibiotics among patients or variation in susceptibility pattern of *E. meningoseptica* isolated from different geographic regions (5). The results of an inappropriate choice of antimicrobial therapy can have negative consequences on morbidity and mortality of patients infected by this pathogen (8). According to our results, *E. meningoseptica* infections can be effectively treated with trimethoprim-sulfamethoxazole, ciprofloxacin, ceftazidime or vancomycin.

As environmental sources are crucial in the epidemiology of hospital setting outbreaks of *E. meningoseptica* infections, hence, making policies like using the decontamination protocols, prescription of appropriate antibiotics and hygiene regimens are important in controlling outbreaks due to this organism.

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Conflict of interest

None declared.

Author Contributions

The involvement of each author was as follows: acquisition of data and practical works: Sedigh H, Heidari H; analysis and interpretation of data: Sedigh H, Heidari H, Nabavizadeh SH; drafting of the manuscript: Sedigh H, Khashei R, Nabavizadeh SH; critical revision of the manuscript for important intellectual content: Khashei R.

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